5.0 ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION

This chapter describes the potential environmental consequences of the construction and operation of the Fuel Production Facility (FPF) at the Savannah River Plant (SRP). In describing the potential environmental consequences from the operation of a FPF at SRP the following items are considered:

- o construction related impacts;
- o changes in air and water quality as a result of normal operations;
- o exposure of the general public and operating personnel to nonradioactive pollutants emitted during normal operations;
- o exposure of the general public and operating personnel to radiation from emissions during normal operations;
- o exposure of the general public to radiation from emissions during abnormal operations (accidents).

5.1 CONSTRUCTION EFFECTS

5.1.1 Land Use and Socioeconomics

The FPF will occupy an enclosed area of about 15 acres on SRP. This area includes the space necessary for the proposed Building 225-H, new roadways, walks, and a parking area. The proposed site is adjacent to existing SRP operating areas (H-Area and S-Area); therefore the land use change will be negligible. In the past the site was designated as an impact area for DWPF, and SREL had used a portion of the site for research. No additional property will be required for FPF construction. There will be no impacts on historic or archaeological sites. Little additional traffic increase can be expected on roads leading to SRP due to the peak construction workforce of 205 workers because there are other major construction projects and normal development in the area, such as the DWPF and the Fuel Materials Facility, which are nearing completion or completed.

The FPF construction is expected to begin in 1986 and to conclude in 1989 with peak construction employment of 205 occurring in 1988. It is expected that the FPF construction workforce will be composed of existing SRP construction workers finishing other projects, rather that new immigrating workers to the SRP area. Therefore, little additional socioeconomic impacts on the surrounding area are expected from FPF construction.

5.1.2 Water Quality and Ecology

Effective erosion control measures will be implemented during construction to mitigate potential erosion and sediment impacts from construction of the FPF. Standard erosion control measures such as hay bales, grass, diversion ditches, and sediment basins will be used if necessary. The proposed FPF site has been essentially unused land containing grasses, bushes, and some trees.

Because of the proposed site's nearness to H-Area, construction activities are expected to have a negligible impact on wildlife. No impacts on threatened or endangered species or wetlands are expected because none are located on the proposed site.

5.1.3 Air Quality and Noise

During construction of the FPF, the sources of air pollution will be construction equipment that emit pollutants from their engines and dust from equipment operations. Other air pollutants might be released during the burning of construction debris and solid wastes, but releases are expected to be local and short-lived. There will be no impact offsite from the noise levels caused by the construction at the FPF site. These noise levels will be similar to those caused by the construction of other industrial projects.

5.2 OPERATIONAL EFFECTS

5.2.1 Land Use and Socioeconomics

Once operational, the FPF will employ 186 people. Since many are already employed at SRP, little additional socioeconomic impacts are expected on SRP's surrounding area. No operational impacts are expected on historic or archaeological sites or other existing land uses at SRP.

5.2.2 Water Quality and Ecology

No surface water will be used during operation of the FPF. All FPF water will be obtained from the Black Creek and Middendorf Formations using existing H-Area water wells and distribution system. Some 250 gpm of water will be needed for FPF's domestic needs--change facilities, works engineering shop, drinking fountains, showers, restrooms; and for process needs and cooling water.

The withdrawal of groundwater from the Black Creek and Middendorf Formations for the FPF will not affect the quality of the water or the offsite water levels in the aquifers. There will be no operational discharges from the FPF to ground waters.

Liquid effluents from the FPF will be recovered or treated to prevent the release to the environment of hazardous materials (hazardous by characteristics), such as caustic solutions from the PM process and nitric acid from the OSUR process. Routine process effluents will be treated in the F&H-Area Effluent Treatment Facility. This facility is a wastewater treatment facility as defined by 40 CFR 260 and therefore it is exempt from the hazardous waste requirements for treatment, storage, and disposal facilities and also for permitting of these facilities. It will be permitted under the South Carolina Pollution Control Act as a wastewater treatment facility. Treatment will include filtration, reverse osmosis, ion exchange, and evaporation. The treated effluent from the facility will meet the NPDES discharge limits and be discharged to Upper Three Runs Creek. Treated waste concentrate from the facility will be sent to the H-Area tank farm for temporary storage and eventual disposal in saltstone (Table 5-1).

TABLE 5-1

SUMMARY OF PROJECTED RELEASES:
FUEL PRODUCTION FACILITY

16 Metric Tons U Annual Throughput

	ANNUAL RELEASE QUANTITIES	
Radioisotopes	Atmospheric	Saltstone or Liquid[b]
Uranium[c]	0.51 g 5.1E-05 Ci	950 g 9.4E-02 Ci
Ruthenium	2.8E-04 Ci	7.3E-05 Ci
Fission Products	0 Ci	7.3E-05 Ci
Chemicals		
NO_2	330 kg	-
SO_2	12,000 kg	-
Ammonia	190 kg	450 kg
HNO_3	600 kg as NO_2	3,400 kg
$NaAl(OH)_4$	-	47,000 kg
NaOH	-	16,000 kg
$NaNO_3$	-	11,000 kg
$NaNO_2$	-	7,800 kg
H_3PO_4	-	220 kg

a Reference: J. S. Allender, Source Terms for Environmental Releases from the Fuel Production Facility, FPF-85-107, July 1985.

b With current FPF scope, acid wastes will be treated in the FPF and encased in saltstone. Caustic wastes will be treated in 300-M Area facilities and also reach saltstone. If an F&H-Area Effluent Treatment Facility is operating, these wastes will be sent there as liquids.

c Including all isotopes but excluding activity from decay daughters.

5.2.3 Air Quality and Noise

Routine air emissions of ventilation air and exhaust gases from the FPF will contain NO_x, SO_x and ammonia and will be less than present emissions from casting operations in M-Area and well below DOE standards. Maximum ground level concentrations from these emissions are expected to be well below ambient air quality standards in South Carolina and Georgia (Tables 5-2 and 5-3). Air emissions will be multiple HEPA-filtered before release to the building stack. Necessary air emissions permits will be obtained from the State of South Carolina and the U. S. Environmental Protection Agency (radioactive air emissions). A NESHAPS permit was applied for in June 1986 from EPA to meet 40 CFR 61 requirements for facility construction. The permit is currently being negotiated with EPA. All FPF air emissions, radiological as well as nonradiological, will be well below applicable State and Federal standards.

TABLE 5-2

EMISSION OF NON-RADIOACTIVE AIR POLLUTANTS FROM

THE FUEL PRODUCTION FACILITY

Chemical Releases on Ground Level

Air Pollutant	Grams/second	Tons/year
NO_2 (includes HNO_3)	2.8E-02	1.0E+00
SO_2 (includes SO_3)	4.0E-01	1.4E+01
NH_3	6.1E-03	2.1E-01

Pollutant Concentrations at Ground Level

	Nearest Plant Boundary, 10 km Distance	
Air Pollutant	Micrograms/m^3	ppm
NO_2 [a]	3.3E-01	1.7E-04
SO_2 [b]	4.6E+00	2.4E-03
NH_3 [c]	7.1E-02	3.7E-05

a Ambient air standard for NO_2 is 100 micrograms/m^3

b Ambient air standard for SO_2 is 80 micrograms/m^3

c There is no ambient air standard for NH_3

TABLE 5-3
1983 GEORGIA AND SOUTH CAROLINA
AMBIENT AIR QUALITY MEASUREMENTS, m/m^3

	Nitrogen Dioxide			
Locations[b]	No. of Obs	24 hr Max	Arith Mean	Exceeds Std GA-SC 100 (yr)
South Carolina				
1	-	-	-	-
2	2056	205	29	No
Georgia				
1	25	46	20.2	No
2	-	-	-	-
3	41	71	36.9	No
4	-	-	-	-
5	-	-	-	-
6	-	-	-	-
7	-	-	-	-

	Sulfur Dioxide			
Locations[b]	No. of Obs	24 hr Max	Arith Mean	Exceeds Std GA-SC 80 (yr)
South Carolina				
1	5306	96	11	No
2	6768	191	17	No
Georgia				
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-
5	-	-	-	-
6	-	-	-	-
7	1481	46	16	No

a Reference: DOE SRP Environmental Report for 1984, DPSPU-85-30-1, Du Pont, SRP, Aiken, SC, 1985

b South Carolina locations: (1) Beech Island;
(2) North Charleston;
Georgia locations: (1) Augusta;
(2) Medical College, Augusta; (3) Water Treatment Plant, Augusta;
(4) Augusta; (5) Augusta; (6) Wrens; (7) Augusta.

\- No analysis

An estimated 5.1E-05 Ci of uranium and 2.8E-04 Ci of ruthenium will be released annually to the atmosphere assuming maximum annual throughput of 16 metric tons of uranium and four-reactor SRP operations (Table 5-1). The maximum dose (to the bone) of an individual at the SRP boundary from routine atmospheric releases is expected to be 6.3E-05 mrem/yr (Tables 5-4 and 5-5).

5.2.3 Solid Waste

Initially, solid process waste will be generated from the M-Area processes the FPF will replace in amounts similar to present levels. However, when the PM process becomes fully operational, the casting process for producing fuel cores will be phased out, thus generating less solid waste and eliminating the generation of contaminated crucibles, molds and carbide tools. Solid waste containing trace amounts of uranium including rags, plastic bags and gloves will be disposed of in the SRP burial ground or incinerated. No solid waste containing more than trace amounts of uranium or ruthenium will be generated. Process chemical waste will be treated in the F&H Effluent Treatment Facility (ETF).

5.3 FACILITY ACCIDENTS

This section summarizes the impacts to an offsite individual and plant personnel from postulated incidents and accidents. Because offsite non-nuclear effects of accidents are negligible and no nonradioactive hazardous waste chemical effects exist, only the radiological effects are described quantitatively.

The maximum dose commitment to an offsite individual at the SRP boundary from a process accident would be 2.8E-01 mrem (to the lung). The maximum dose (to the lung) of an offsite individual would vary from 1.7E-01 mrem (following a tornado with 150 mph winds or greater) to 1.8E+01 mrem (following an earthquake of modified Mercalli intensity VIII or above. These doses are well below proposed DOE standards for accidents (DOE Order 6430, Ch. I). The FPF will include design and administrative controls, physical guards, container sizes and accountability procedures of at least 3 levels of redundant protection to prevent nuclear criticality. The annual probability of a criticality event occurring is estimated to be less than 6E-05.

An event tree analysis of potential process accidents shows that there are no credible accidents within the FPF which could compromise the building containment. Thus, the offsite dose risk is determined by the fraction of dispersible material which could pass through the building HEPA filters. Offsite doses due to accidental releases from the proposed FPF site are about a factor of ten smaller than projected doses from the present facility site in M-Area because of increased atmospheric dilution (increased distance to the SRP boundary).